Space Weather Forecast

Issued on Friday, 26 November 2021 at 12:07 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor Geomagnetic Storm G1 later this UTC weekend due to a Coronal Mass Ejection (CME). A further new CME is undergoing assessment for any future Earth-based effects.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been very low over the past 24 hours, with no significant X-ray flares. There are currently up to four sunspots on the facing side of the sun, although one is very faint and may not persist, This has left a pair of small new magnetically bipolar regions in addition to the larger and longer-standing group of recent days. This final region showed a further growth trend in the 24 hours, with proliferation in its intermediate portions. Despite its growth, as stated, no significant flares were observed.

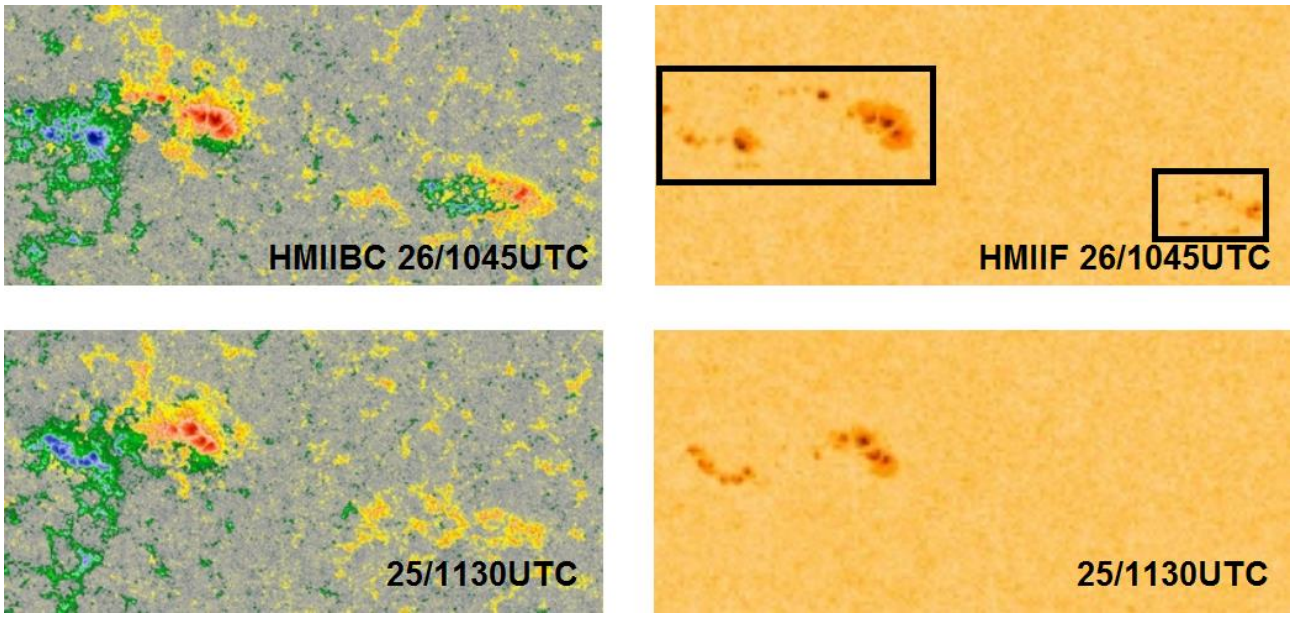

Figure 1: False colour magnetic and visible satellite imagery of the (larger) long-standing sunspot region and a newly-developed bipolar region near the middle of the sun, showing growth in both over the past 24 hours. No significant X-ray flares were observed.

At 26/0010UTC, a faint 'filament eruption' (arc of plasma) was seen in ground-based imagery leaving the northeastern portion of the sun. Imagery for the relevant period is scant and faint - both rendering analysis difficult. Cursory assessment suggests that a Coronal Mass Ejection (CME) may be largely directed above and behind the path of Earth in its orbit, however this will be re-assessed when imagery allows.

No other events spawning potentially Earth-directed CMEs were identified in available imagery.

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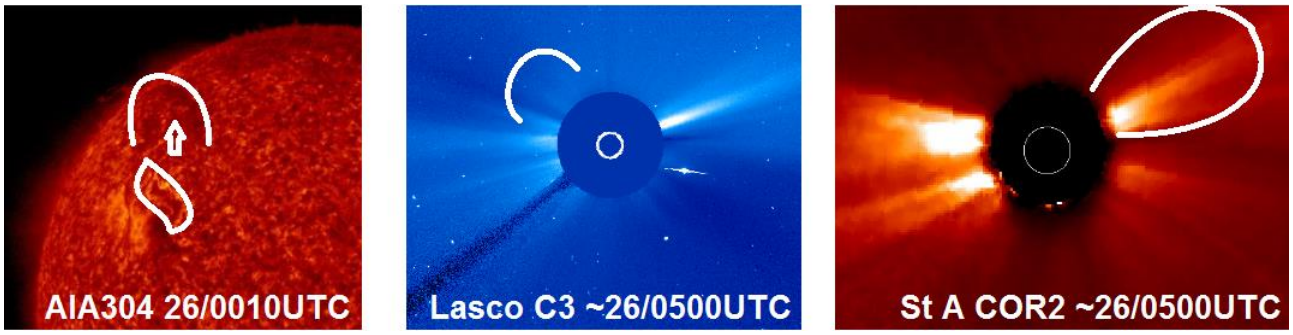

Figure 2: A northeastern quarter of the sun 'filament eruption' (left) and resulting satellite imagery implying a CME for the ensuing hours. The link to this event in each satellite image is not certain, and analysis of the event is underway, although cursory assessment suggests this event is mostly above and behind the Earth in the path of its orbit.

Solar Wind / Geomagnetic Activity: The solar wind evolved from the remnants of a fast regime to become slow in the period, probably signalling the end of the influence of a long-lasting coronal hole (of around a week's duration).

The solar wind speed, fell from slightly elevated to reach background levels by the period's end. The number of particles in the solar wind fell and then rose within a typical range, while the magnetic field associated with these particles was unremarkable, as was the north-south component.

The net result of the above solar wind measures was provisionally quiet geomagnetic indices throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be low, with a daily 20% Chance of common-class flares, although the recent growth trend of the largest sunspot will be monitored.

Solar Wind / Geomagnetic Activity: The 26/0010UTC 'filament eruption' in the northeast requires further imagery to analyse, but appears largely directed above and behind Earth's orbital path. Otherwise, an earlier CME from a filament eruption leaving the Sun 24/1300UTC may reach Earth late Saturday 27, possibly early Sunday 28 November. There is considered to be a 30% chance of Minor Geomagnetic Storm G1 from this event, probably peaking within the UTC day of Sunday 28 November (Day 3).

Quiet geomagnetic activity is otherwise expected, although there is a chance of a slight enhancement to the solar wind should a second 'coronal hole' become geoeffective into the coming UTC weekend. Both the timing and presence of this aspect low confidence, even if the expected magnitude of effects is more certain (in being small).

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	10	30	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	1	1	1	1
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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